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ABSTRACT

This study reports the results of the pre and post mathematics test administered to student participants of the 2001 Summer Bridge Program, sponsored by the Minority Engineering, Mathematics and Science Department (MEMS) at the University of New Mexico (UNM). There was a four-week time span between the administration of the standardized test, which was administered to 28 incoming science, engineering and mathematics (SEM) students by UNM's Testing Center. Results showed that there was an increase in the initial mathematics placement of approximately 42.9% of the students. There was also an increase in the mean, median and mode of the algebra component of the test, and a change in the correlations between several of the eight variables. (Author)

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The Effects of a Week-Four Summer Bridge Program

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The Effects of a Four-Week Summer Bridge Program

Abstract

This study reports the results of the pre and post mathematics test administered to student participants of the 2001 Summer Bridge Program, sponsored by the Minority Engineering, Mathematics and Science Department (MEMS) at the University of New Mexico (UNM). There was a four-week time span between the administration of the standardized tests, which was administered to 28 incoming science, engineering and mathematics (SEM) students by UNM's Testing Center. Results showed that there was an increase in the initial mathematics placement of approximately 42.9% of the students. There was also an increase in the mean, median and mode of the algebra component of the test, and a change in the correlations between several of the eight variables.

Introduction

In a 1999-2000 survey of 47 ``Indian high schools'' in the United States, Dr. Dean Chavers showed that; a) 34% of the students were enrolled in at least one college prep class, b) 77% of the ninth graders were enrolled in Algebra I, C) 10% had taken four years of college prep math, d) 33% were not enrolled in any math course, and e) only 5% were enrolled in calculus (Chavers, 2000). The results of his survey are generally typical of minority serving educational institutions. The School of Engineering (SOE) at UNM has been addressing the issue of low recruitment and retention of minority students over a number of years. In addressing the issues MEMS was created with the aid of an initial grant of $60,000.

The primary goal of MEMS is to ``increase the retention and graduation rates of Minority and women students in engineering, computer science, mathematics, or the hard sciences'' (Torres 2000). In partial pursuit of the goal MEMS sponsors an annual four week intensive summer program for incoming minority SEM majors. Mathematics is a major component of the program because many minority students are found to be deficient in it (Torres 2000). MEMS recognizes that placement in lower level mathematics courses can have an adverse affect on the self-esteem of students. It can also lengthen the time it takes them to complete their college degrees.

One of the approaches taken by MEMS in addressing the phenomenon was to teach mathematics using small group instruction with group facilitators. Previous research has shown that interactions in these groups tend to have positive effects on achievement, persistence (attrition),

and attitudes (Cooper & Robinson 1998). Further this approach has ``particularly powerful impacts on women and minority students'' and on critical thinking (Cooper et.al).

UNM relies on the ACT/SAT scores to place its freshmen students in appropriate mathematics, English and reading classes, however students may challenge the scores by taking a placement test through the university's Testing Center. MEMS collaborated with the testing center and UNM's Department of Mathematics to test the validity of the MEMS four week mathematics component of the Summer Bridge Program. If the mathematics component of the 2001 Summer Bridge program performed as designed, a gain in the mathematics placement should be expected for most of the program students.

Several methods of were utilized in the mathematics course including; a) semi-formal lectures one hour in length five days a week, b) one hour of team work five days a week, c) two hour evening structured study sessions three times a week, facilitated by advanced SEM students, and d) the use of a text book designed specifically for the course by a staff member of MEMS.

Purpose

The purpose of this study was to investigate the effect(s) that the 2001 MEMS Summer Bridge Program had on the placement of its participants in mathematics courses at UNM.

Method

All participants were administered the mathematics placement test by the Testing Center at the UNM. The test was administered under standardized conditions on the first day of the Summer Bridge Program, and a second version was again administered on the last day of the program. Datum was obtained from high school transcripts including grade point averages (GPA), ACT mathematics scores, ACT composite scores, and high school rank. This data was combined with algebra scores (pre and post) from UNM's placement test, and the recommended placement in mathematics courses based on testing center scores. Descriptive statistics and correlations were run on the results using SPSS version 10.0.

Results

Eighteen (64.3%) of the participants improved their algebra scores from an average of 54.1 to 69.4, resulting in an average increase of 15.3. Twelve (43.0%) of the participants improved their placement in mathematics courses by one level. Overall the mean for the algebra scores increased from 61.1 to 68.3, a positive change of 7.2, the median increased from 61.0 to 76.0, a positive 15.0 change, and the mode increased form 31.0 to 76.0 a positive jump of 45.0.

Prior to the onset of the Summer Bridge Program the strongest correlations between the placement of UNM mathematics courses were with the Testing Centers algebra scores ($r=.734$, $p<.01$), ACT Mathematics scores ($r=.639$, $p<.01$), and ACT Composite scores ($r=.589$, $p<.01$). At the end of the program the strongest correlations were with the final grade for the course ($r=601$, $p<.01$), Testing Centers algebra scores (post test) ($r=.585$, $p<.01$), and the initial algebra scores ($r=.568$, $p<.01$).

Conclusion

MEMS was successful in achieving one of its goals, which was to increase the placement of its students in their mathematics courses at the University of New Mexico.

The correlations between their placement in the mathematics courses differed between pre and post program. Strongest predictors for placement (pre-program) were with Testing Centers algebra scores, ACT Mathematics scores and ACT Composite scores, respectively. Post program correlations with placement were strongest with course final grade, Testing Center algebra scores (post-test), and Testing Center algebra scores (pre-test), respectively.

Though the number of subjects in the study was small it is evident that the mathematics component of the program was successful. However, it is unclear which of the variables was most influential for the success.

Suggestions

It would be in the best interest that the 2002 Summer Bridge program maintain a format similar keeping the following suggestions in mind:

- Half-day orientation for the mathematics tutors, instructors and staff of the program
- One to two hour seminar on skills essential for tutoring required for all tutors
- Weekly meeting (debriefing) with tutors and instructor
- Do post-testing two days before the conclusion of the program
- Include test taking strategies as a component of the program

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